

ABSTRACT

A sub-harmonic mixer having at least one diode ring array used for up-conversion in a transmitter and for down-conversion in a receiver. Each diode ring array has a plurality of (e.g.,
5 four) diode rings arranged in parallel. The diode ring array may be connected in parallel or series with the signal flowing in the circuit. In a transmitter, a local oscillator (LO) generates an LO frequency signal. The sub-harmonic mixer generates a signal having twice the LO frequency using the LO
10 frequency signal, and multiplies it to an intermediate frequency (IF) signal to generate a radio frequency (RF) signal for transmission. The sub-harmonic mixer may be a sub-harmonic image rejection mixer having two diode ring arrays (i.e., sub-harmonic mixers) that are coupled together through a 90° hybrid
15 at an input and a 90° hybrid at an output. In a receiver, the sub-harmonic mixer receives an input RF signal and generates an output IF signal in a reverse process.